DaimlerChrysler AG

Patent Claims

1. An arrangement (1) for supplying voltage to a number of loads (2, 2'), in particular in a vehicle (36), having a vehicle power supply system (6) which has at least two energy stores (4a, 4b), a first energy store (4a) of which is connected in a starter circuit element (6a) to a starter (8) for starting an engine, and a second energy store (4b) of which is connected in a load circuit element (6b) to the load (2, 2'),
characterized
in that
a controller (16) is provided, which has
a coupling element (12), via which the starter circuit element (6a) can be connected to the load circuit element (6b),
additional coupling elements (14), via each of which in each case one load (2') which is classified as being safety-relevant can be connected to the starter circuit element (6a), and
a measurement means (22) for detection of data, from which a data processing unit (18) in the controller (16) can determine the state of the energy store (4a, 4b) for each circuit element (6a, 6b), as well as data (32, 34) which supplies information about a current (Is) to a safety-relevant load (2') as well as a voltage (Uc) which is dropped across a safety-relevant load (2') so that the data processing unit (18) can continuously monitor the state of the energy stores (4a, 4b) for the circuit elements (6a, 6b) as well as the safety-relevant loads (2') and the paths to the safety-relevant loads (2') and can control switching of the coupling element (12) and/or of the additional coupling elements (14) in response to this state.

2. The arrangement as claimed in claim 1,

characterized
in that
the data processing unit (18) in the controller (16) uses the voltage of the first energy store (4a), which is applied to respective safety-relevant loads (2') by associated disconnected coupling elements (14), for current-free monitoring and determination of the availability of supply to the respective safety-relevant load (2') independently of the state of the load circuit element (6b) and the controller drives a coupling element (12") or a safety device in addition to the coupling element (12") corresponding to the determined availability of the supply.

3. The arrangement as claimed in claim 1 or 2,
characterized
in that
the controller (16)
- in a normal mode, when it is determined that the load circuit element (6b) is fully available, controls the switching of the coupling element (12, 12") such that the safety-relevant load (2') is supplied only by the load circuit element (6b),
in a second operating mode, when it is determined that the load circuit element (6b) is not fully available, controls the switching of the coupling element (12, 12") such that the load circuit element (6b) is supported via the coupling element (12") by the first energy store (4a) and the starter circuit element (6a), in order to ensure the entire supply, and
in a third operating mode, when it is determined that the load circuit element (6b) has failed completely, controls the switching of the coupling element (12") such that the coupling element (12") is disconnected or a safety device in addition to the coupling element (12") achieves disconnection from the starter circuit element (6a) and the load circuit element (6b), and the safety-relevant load (2') is supplied only via the

starter circuit element (6a) from the first energy source (4a).

4. The arrangement as claimed in one of claims 1 to 3,
characterized
in that
the data processing unit can determine an amount of charge which is drawn by each safety-relevant load (2') from the data (32, 34), can control the coupling element (12) and/or the additional coupling elements (14) as a function of the state of the energy store (4a, 4b) and/or of the ranking of the relevant safety-relevant load (2'), and/or can connect and/or disconnect the safety-relevant load (2').

5. The arrangement as claimed in one of claims 1 to 4,
characterized
in that
when the data processing unit (18) determines that the second energy store (4b) has fallen below a capacity limit or has failed, the safety-relevant load (2') is connected to the first energy store (4a) via the coupling element (12).

6. The arrangement as claimed in claim 5,
characterized
in that
when the data processing unit (18) determines that a capacity limit of the first energy store (4a) has also been undershot, the respective additional coupling element (14) for the safety-relevant loads (2') is controlled such that individual safety-relevant loads (2') are disconnected on the basis of their ranking.

7. The arrangement as claimed in one of claims 1 to 6,

characterized
in that
the data processing unit (18) determines from the data supplied to it the amount of energy which is required for the respective safety-relevant load (2') and ensures that only this amount of energy is supplied to the safety-relevant load (2').

8. The arrangement as claimed in one of claims 1 to 7,
characterized
in that
the safety-relevant loads (2') are coupled to the starter circuit element (6a) entirely or largely without any quiescent current by means of the additional coupling element (14).

9. The arrangement as claimed in one of claims 1 to 8,
characterized
in that
the controller (16) switches the loads (2) and/or the safety-relevant loads (2') as a function of the detected data.

10. The arrangement as claimed in one of claims 1 to 9,
characterized
in that
the additional coupling element (14) comprises at least one field-effect transistor (24) and a diode (26).

11. The arrangement as claimed in one of claims 1 to 10,
characterized
in that
the coupling element (12) is in the form of a switch (12") or a DC/DC voltage converter (12').

12. The arrangement as claimed in one of claims 1 to 11,
characterized
in that
the energy stores (4a, 4b) are of such a size that they have the amount of charge required for cold starting of an internal combustion engine only when they are interconnected.